

The Influence of a Commercial Few-Layer Graphene on the Photodegradation Resistance of a Waste Polyolefins Stream and Prime Polyolefin Blends

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Surface appearance of MPWS/FLG composites with higher concentrations of FLG

The SEM images in Figure S1 (a, b) depict the surface finish of MPWS/FLG composites, with 7, and 10 wt.% of FLG, respectively, after 4 weeks of exposure to UV radiation. The MPWS composite filled with 7wt.% of FLG exhibits a few small cracks along with surface delamination after UV exposure. Interestingly, the UV exposed MPWS/FLG - 90/10 composite displays fewer cracks but more surface delamination. It has been observed that a lower concentration of FLG demonstrates a reduction in crack formation in the UV exposed MPWS composites, while a higher concentration of FLG effectively prevents crack formation but cannot mitigate the surface delamination phenomenon in MPWS composites during UV exposure. Based on the surface finish of the UV samples, it can be said that the presence of FLG slows down the UV degradation of mixed polyolefin waste stream and further retardation of UV degradation is possible with a higher concentration of FLG.

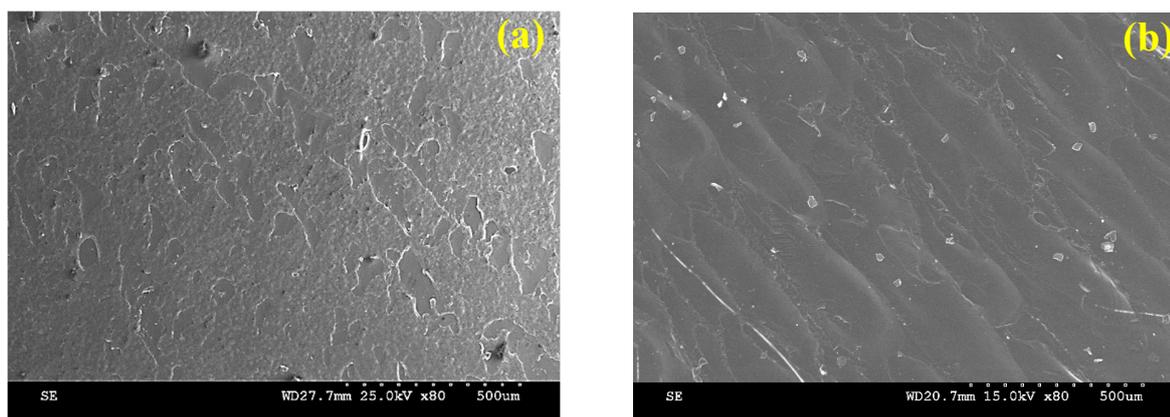


Figure S1: SEM images of the surfaces of MPWS blend compounds with (a) 7 wt.% FLG and, (b) 10 wt.% of FLG; after 4 weeks of UV exposure.

Retention of tensile strength and tensile modulus of MPWS/FLG composites after 4 weeks of UV exposure

Figure S2(a) and S2(b) show that retention of tensile strength and tensile modulus for each of the exposed MPWS/FLG samples are well above 90%. This indicates that these properties of the polymeric materials have been less sensitive to UV exposure, at least for the irradiation duration, adopted in this study.

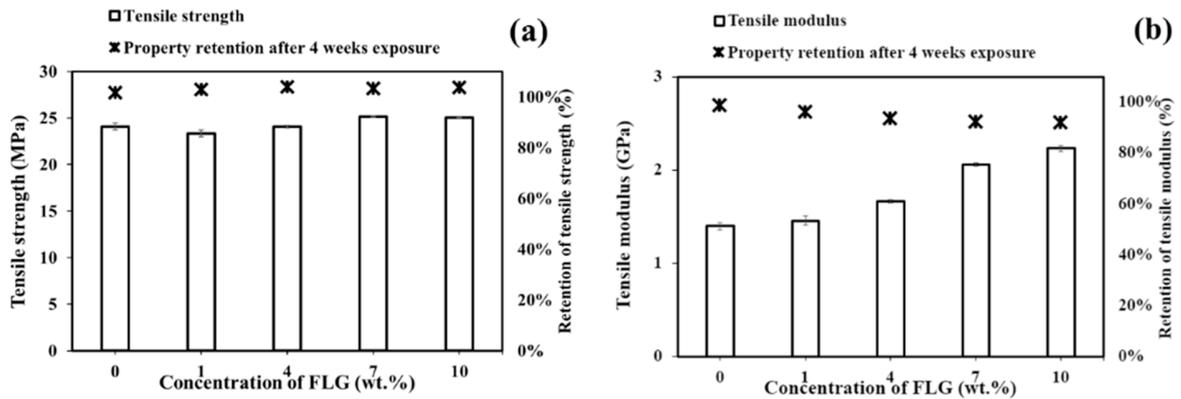


Figure S2: (a) tensile strength and retention of tensile strength, and (b) tensile modulus and retention of tensile modulus of UV-exposed MPWS/FLG composites as a function of FLG concentration, present in the composites.